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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,284	10/27/2003	Frank Y. Xu	PA94/MII-48-30-03	2766

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EXAMINER	
TOLEDO, FERNANDO L	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/694,284	XU ET AL.	
	Examiner	Art Unit	
	Fernando L. Toledo	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24 and 49-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,21-24 and 49* is/are rejected.

7)☒ Claim(s) *18-20,50 and 51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1 – 18, 12 – 17 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sreenivasan et al. (US Patent Application Publication US 2004/0124566 A1). In view of Kim et al. (U. S. Patent 6,503,829 B2).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

3. In re claims 1 and 49, Sreenivasan, in the US Patent Application Publication US 2004/0124566 A1; figures 1 – 41 and related text, discloses forming a first layer 18 on at least a

portion of a surface of the substrate 20, the first layer including at least one layer of a first material, which one layer abuts the surface of the substrate; forming a second layer 44 of a second material on at least a portion of the first layer, which second layer is imprinted with the patterned features; removing at least portions of the second layer to extend the patterned features to the first layer (Figure 24B); removing at least portions of the first layer to extend the patterned features to the substrate (Figure 24C).

Sreenivasan discloses using an etching technique. Sreenivasan does not disclose which etching technique.

However, Kim in the U. S. Patent 6,503,829 B2 discloses a wet etching technique using two mask layers wherein the first layer and the second layer may be exposed to an etching process that undercuts the patterned features, and the first material may be lifted-off (Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the wet etching technique of Kim in the invention of Sreenivasan since it would enable the practitioners of Sreenivasan to etch the second material with a known etching technique.

4. In re claim 2, Sreenivasan, discloses wherein the etching process causes etching of the first material and no etching of the second material (Paragraph 0156).

5. In re claim 3, Sreenivasan discloses wherein the etching process causes etching of the first material and etching of the second material at a slower rate than a rate at which the first material is etched (Paragraph 0156).

6. In re claim 4, Sreenivasan discloses wherein the second layer does not intermix with the first layer (Paragraphs 0156 and 0157).

7. In re claim 5, Sreenivasan discloses wherein the step of removing at least portions of the second layer includes dry etching (Paragraph 0157).

8. In re claim 6, Sreenivasan discloses wherein the step of removing at least portions of the first layer to extend the patterned features to the substrate does not remove the second material (Figure 24C).

9. In re claim 7, Sreenivasan discloses wherein the first layer and the second layer are selectively etchable (Paragraph 00156).

10. In re claim 8, Sreenivasan discloses wherein the second layer includes a silicon-containing material and the first layer includes a non-silicon containing material (Paragraphs 0111 – 0114 and 0156).

11. In re claim 12, Sreenivasan discloses wherein step of forming the second layer includes dispensing an acrylic-based polymerizable fluid (Paragraphs 0111 – 0114).

12. In re claim 13, Sreenivasan discloses wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) n-hexyl acrylate; (c) ethylene glycol diacrylate; and (d) 2-hydroxy-2-methl-1-phenyl-propan-1-one (Paragraphs 0111 – 0114).

13. In re claim 14, Sreenivasan discloses wherein the acrylic-based polymerizable fluid further includes a surfactant (Paragraph 0215).

14. In re claim 15, Sreenivasan discloses wherein the acrylic-based polymerizable fluid (a) isobornyl acrylate; (b) acryloxymethyltrimethylsilane; (c) (3-acryloxypropyltristrimethylsiloxy) silane; (d) ethylene glycol diacrylate; and (f) 2-hydroxy-2-methl-1-phenyl-propan-1-one (Paragraphs 0111 – 0114).

15. In re claim 16, Sreenivasan discloses wherein the acrylic-based polymerizable fluid further includes a surfactant (Paragraph 0215).

16. In re claim 17, Sreenivasan discloses wherein the UV initiator includes 2-hydroxy-2-methl-1-phenyl-propan-1-one (Paragraphs 0111 – 0114).

17. Claims 9 – 11 are rejected under 35 U.S.C. 103(a) as being obvious over Sreenivasan and Kim as applied to claims 1 – 8 and 12 – 17 above, in further view of Wolf and Tauber (Silicon Processing for the VLSI Era Volume 1: Process Technology).

In re claim 9, Sreenivasan discloses wherein the step of removing at least portions of the second layer to extend the patterned features to the first layer includes an anisotropic etch (Figure 24B and Paragraph 0155).

Sreenivasan in view of Kim does not disclose wherein the etching component includes a halogen component. However, Wolf and Tauber, in the textbook, Silicon Processing for the VLSI Era Volume 1: Process Technology discloses that CF_4 is extensively used in the anisotropic (dry) etching of materials during VLSI fabrication (Page 541).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use CF_4 as the halogen containing component of the etching of Sreenivasan in view of Kim, since, as taught by Wolf and Tauber, CF_4 is widely used in the etching step of the VLSI fabrication.

18. In re claim 10, Wolf discloses wherein the anisotropic halogen etch is an anisotropic halogen reactive ion etch including a fluorine-containing precursor (Pages 541 and 542).

19. In re claim 11, Sreenivasan discloses etching the first material.

Sreenivasan in view of Kim does not disclose wherein the etching is done by an oxygen plasma etch.

Wolf and Tauber discloses that plasmas containing pure oxygen at moderate pressures attach organic materials to form CO, CO_2 and H_2O as end products. Oxygen plasma provide highly selective method for removing organic materials, since the O_2 plasma do not etch Si, SiO_2 or Al (Page 564).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use oxygen plasma etch to etch the first layer of Sreenivasan in view of Kim, since, as taught by Wolf and Tauber, oxygen plasma is highly selective at removing organic films.

20. Claims 21 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sreenivasan in view of Kim as applied to claims 1 – 8 and 12 – 17 above, and further in view of Sakamoto et al. (US Patent Application Publication US 2005/0118749 A1).

In re claims 21 and 24, Sreenivasan discloses wherein the second layer does not intermix with the another layer (paragraph 0156).

Sreenivasan in view of Kim does not disclose wherein the first layer includes the one layer and another layer of another material disposed on the one layer, and wherein the another layer is a BARC layer. Sakamoto, in the US Patent Application Publication US 2005/0118749 A1, discloses that BARC layers are placed under resist layers to protect the resist layer from random reflection and standing wave off the substrate (Paragraph 0002).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a BARC layer in the invention of Sreenivasan in view of Kim, since as taught

by Sakamoto, a BARC layer protects the resist layer from random reflection and standing wave off the substrate.

21. In re claim 22, Sreenivasan in view of Kim discloses wherein the etching process causes etching of the first material and no etching of the another material (Figure 3 of Kim).

22. In re claim 23, Sreenivasan in view of Kim discloses wherein the etching process causes etching of the first material and etching of the another material at a slower pace rate than a rate at which the first material is etched (Figure 3 of Kim).

Claim Objections

23. Claims 18 – 20, 50 and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

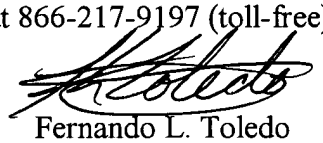
24. Applicant's arguments with respect to claims 1 – 24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fernando L. Toledo
Examiner
Art Unit 2823

flt
21 December 2005